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POLICY INSIGHTS 55

MINING THE SOCIO-ECONOMIC BENEFITS OF THE EXTRACTIVE INDUSTRIES

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EXECUTIVE SUMMARY

The convergence of political, economic, social and environmental dynamics is accelerating in the age of the Fourth Industrial Revolution. In this new world of 'always on' technology the mining sector, like many others, needs to adapt and align with the Sustainable Development Goals (SDGs) and the Africa Mining Vision (AMV), placing the communities and environments in which they operate at the centre of their business. As the initiator and driver of the Socio-Economic Technology Initiative (SETI) Project, Mining Dialogues 360° (MD360°) contends that by using innovative technology in data gathering, information management and analysis, development planning frameworks in mining areas can be enriched and the socio-economic impact and contribution of mining to sustainable development significantly improved. This should also result in a more equitable distribution of the shared value arising from the extractive industry.

INTRODUCTION

The UN Agenda 2030[1] with its SDGs is a global plan of action for social inclusion, environmental sustainability and economic development. Attaining the SDG targets will depend on high levels of cooperation and partnerships between all sectors and stakeholders. The various actors in the mining industry will need to incorporate the SDGs, which emphasise the need for inclusive

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Shared value embodies the notion that all stakeholders, especially employees, shareholders, and host governments and communities, should receive a fair share of the resource endowment and the economic opportunities it generates

economic and social development, into their policies and practices.[2] Furthermore, the AMV envisages a new social contract in the sector that will result in 'integrated development, with diverse economic linkages and increased social well-being, livelihood security and reduced vulnerability of poor communities'.[3] This provides a large scope for intersection with the concept of shared value in mining. Shared value embodies the notion that all stakeholders, especially employees, shareholders, and host governments and communities, should receive a fair share of the resource endowment and the economic opportunities it generates.[4] Harvard Business school professors, Michael Porter and Mark Kramer, write that 'shared value is not social responsibility, philanthropy, or even sustainability, but a new way to achieve economic success'.[5]

FIGURE 1 SUSTAINABLE DEVELOPMENT GOALS

Source: UN, 'Sustainable Development Goals: 17 goals to transform our world', http://www.un.org/sustainabledevelopment/news/communications-material/, accessed 5 March 2018

While governments, industry and civil society have all endorsed the concept of shared value, the implementation of policies to realise its achievement has been inconsistent within and between countries. While there are examples of important success, there remain far more examples of failure and few research efforts have explored why shared value projects succeed and why they fail.[6] Of equal importance, there is little research as to why some companies are leaders while others do not effectively engage communities and governments to ensure that shared value and meaningful socio-economic development through mining becomes a reality. This despite the fact that there is an increasingly obvious parallel between the lack of shared value in any given project and the heightened levels of social risk the project faces from local communities and society more broadly.[7]

THE GLOBAL CONTEXT

From this perspective, social risk and shared value, or implementation of the SDGs in social and economic development, are two sides of the same coin in the mining sector. As international financiers begin to insert this risk element into financing processes, it will become increasingly important to understand which factors support effective shared value and which factors work against it. Indeed, many observers now understand social risk – from a failure to meet social and economic development expectations – as a leading risk.[8]

Governments, industry, labour, civil society and local communities need to collaborate in their planning activities to achieve social and economic development. But the evidence base that informs the success of this effort needs to be developed more. Stakeholders such as think tanks need to make the academic literature more digestible so that findings can be practically implemented. The diversity, scope and nature of the mining industry offer the potential to contribute positively to all 17 SDGs but the relevant actors need to ramp up engagement, partnership and dialogue with other sectors and stakeholders to address the challenges. The goal is to mainstream social and environmental performance into the core business of mining operations.

SHARED VALUE, MINING AND THE SDGs

Achieving shared value and sustainable socio-economic development is bedevilled in many cases by fraught relations between mining companies, host country governments, and mine-affected communities. On the one hand, ignoring a shared value approach is evidently costly. On the other, successfully demonstrating the benefits is a challenge. Therefore, there is an urgent need to better interrogate available data to understand the complex set of factors that determines the distribution of costs and benefits arising from mining. Data analysis should also show how the social and environmental costs can be mitigated and the benefits more appropriately shared.

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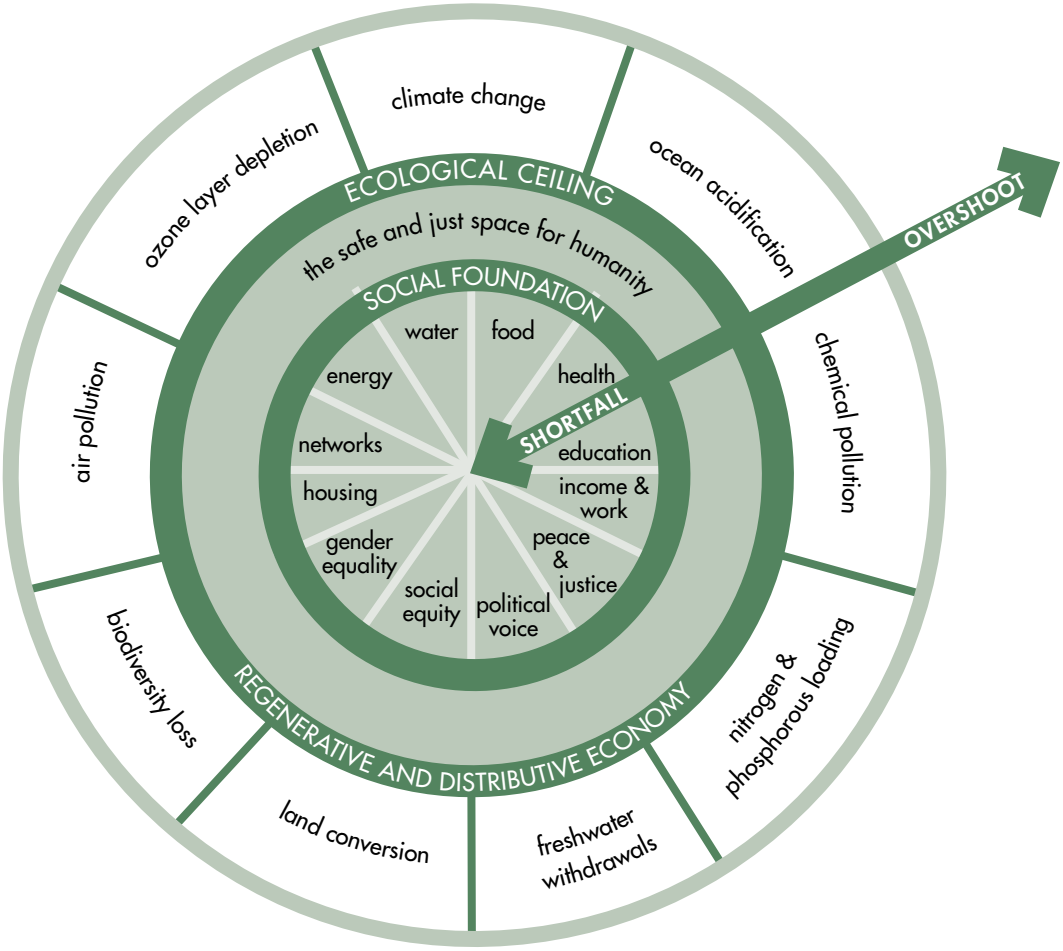
To this end, and in order to enhance the contribution of mining to the achievement of the SDGs, it is necessary to address issues that continue to generate social risk, some of which prevent the shared value outcome. These would include matters such as:

The impact of advances in mining technology and greater mechanisation. Mining will provide fewer direct jobs in the future. The mine of the 21st century is likely to be minimally invasive, operated predominantly by new technologies that require less human intervention. For instance, geothermal mapping may be done by drones to increase the efficiency of geological drilling and sampling. Rock drill operators will most likely be replaced by robots, except in unusual cases. Most mines of the future will be underground from inception, reducing the surface-level footprint. Some ore can be crushed before being removed from the mine site. Automated, driverless trucks will transport the crushed ore to smaller, dynamic plants for processing. While traditional jobs will be replaced, more jobs may be created for programmers and technicians to run 'virtual mines'. Some materials will no longer be mined. As the Fourth Industrial Revolution[9] moves the world

towards a doughnut[10] or circular economy,[11] where natural resource consumption becomes more decoupled from economic growth, minerals such as coal may become obsolete.[12]

FIGURE 2 THE 'DOUGHNUT' ECONOMY



Source: Raworth K, 'The Doughnut of Social and Planetary Boundaries', https://www.kateraworth.com/doughnut/, accessed 5 March 2018

However, the world will require roughly double the minerals and metals currently extracted to meet the demands of the future.[13] Minerals and metals such as platinum (for fuel cells), copper (for solar plants), lithium (for battery technology), chrome and manganese (for wind turbines) and cobalt (for electric vehicles) will be in particularly high demand. Direct employment opportunities will nonetheless decrease over time – a potential risk that must be managed, especially in volatile political economy contexts where unemployment rates are high.

Migration dynamics. Migration technically offers countries the opportunity to expand the production possibility frontier as new skills and innovation enter the

labour force. However, migration also creates social dynamics that are difficult to navigate if employment opportunities are scarce and the prevailing expectation is that new mining projects will solve those employment challenges. Moreover, near-mine community dynamics change over time and are shaped by new jobseekers entering the market as mining projects become successful.

Maturation. In mature mining jurisdictions, where ore bodies are becoming more difficult and expensive to mine, employment opportunities are dwindling. This is particularly challenging for a jurisdiction such as South Africa's where mines are becoming marginal and the labour-absorptiveness of the past is not likely to be repeated. The risk of having post-mining ghost towns that have no sustainable economic activities beyond the life of the mine is substantial. Policymakers and mining companies have an acute responsibility to address this – and the legacy effects of mining (both social and environmental) – by planning for closure from the beginning of a project.

The drive for a cleaner and safer industry. Not only are mining companies under pressure to provide jobs, invest in social programmes and contribute to a host jurisdiction's economy beyond the life-of-mine, but they are also to do so by ensuring the most rigorous health and safety standards are met. Fatalities are not tolerated. Moreover, mining has a reputational risk for contributing disproportionately to pollution and climate change. While new technologies provide opportunities for new mines to be minimally invasive, transitioning from an existing large-footprint mine to a smaller, cleaner mine is expensive.

With hindsight, conventional computing solutions based on rules and logic that usually follow rigid decision-tree approaches have proven to be inadequate and have not yielded insights into how to successfully navigate the social and environmental dynamics at play in the mining industry. In an era where there is a pressing need for more complex, evidence-based decisions, more innovative and effective approaches to policy-orientated research in the mining industry are urgently needed. Advancements in big data processing power and machine learning technologies offer an opportunity to accelerate and deepen the understanding of complex, interconnected issues and enable problem solving at a scale not conceivable before.

A GLOBAL PROJECT

In an effort to make use of the advent of big data, machine learning, the Internet of Things and artificial intelligence, MD360° is developing SETI, an open data collaborative platform to analyse mining-related socio-economic information. SETI has a twofold purpose.

First, and most importantly, it will allow for direct input from – and feedback to – members of mine-affected communities. From a policy perspective this is novel and exciting as it has the potential to disrupt two major difficulties that tend to confront community engagement – fragmentation and gatekeeping. In building relationships with communities, it is often difficult to know which representatives are legitimate or credible.[14] Consequently, companies tend to underinvest in relationship-building and comply only minimally to attain a 'social licence to operate'. Open access platforms that allow direct input from community members may help to move

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mining beyond licence-thinking and to genuinely mainstream social performance into the core of how business is done.[15]

Second, the platform will provide access to a large and complex body of information. Through intuitive machine applications, users can obtain crucial insights into the issues faced by mine-affected community members and potential best-case solutions to similar types of problems. Development economists increasingly recognise the crucial role of participatory decision-making in designing development interventions. Mining has a reputation for paying scant attention to affected communities and offloading social and environmental costs onto them without compensation. While no technological intervention can substitute for relationship-building, technology of this nature reduces the transaction costs of collaboration and understanding among the different stakeholders.

Theoretically, then, this kind of platform should produce more valuable socio-economic outcomes from mining. Greater transparency, objective monitoring and evaluation and effective accountability should also result. As the UN World Data Forum's adopted motto aptly says, it should be possible to 'Leave No One Behind' in the pursuit of enhancing mining's contribution to achieving the SDGs and ensuring that shared value becomes a reality.

The next section details some of the challenges in the South African context to provide an idea of what a new technological platform harnessing big data could accomplish. If it works in South Africa – a complex case – it could theoretically be replicated across the continent with minor adaptations to suit each context more appropriately.

The South African context. South Africa has a long history of mining, a strong system of national statistics, and arguably the most advanced policy, regulatory and development planning frameworks in Africa. Yet, it has struggled immensely to address the negative legacy effects of mining. The reality is that a framework for integrated economic growth and development planning across national, provincial and local government remains poorly aligned and fragmented. Respective actors at each level are not incentivised to work with their counterparts in different spheres of government, which results in incoherent planning. The corollary is that resources are not efficiently allocated to the areas or municipalities that need it most. Even when resources are available, local municipalities lack planning and spending capacity. Mining activity also happens to be geographically correlated with the least-resourced municipalities, which places a further development burden on mining companies.[16]

As a consequence of planning non-alignment, mandates overlap and create confusion. This is especially the case where municipal land and land held in tribal trust overlap near or in mining areas.[17] Money ring-fenced for development within community trusts has been known to disappear.[18] The local-level Integrated Development Plans (IDPs) often reflect aspiration rather than realistically attainable development. This means that even if mining companies provide resources to help execute the IDPs, poor formulation and the lack of inclusiveness in their construction may hinder progress. The cumulative effect of these factors is increased dissatisfaction, social tension and violent protest.

In mineral-rich areas, mining companies become involved in infrastructure development, through investments made both inside the mine property and in supporting infrastructure that traverses but does not always serve communities. Through their Corporate Social Investment (CSI) spend generally – and in recent years through their Social and Labour Plans (SLPs)[19] – the mining companies also make significant contributions to project-level spending on social and economic infrastructure at a local level per individual mining licence area. However, several concerns complicate effective local planning. These include questions about how consultative and inclusive SLP planning is, whether feasibility is tested before or after projects are included in an SLP, and even to what extent SLPs are aligned with municipal IDPs. The SLP Guidelines[20] are also not sufficiently developed to address these shortcomings.

Maximising the collective impact of allocations made by local government to IDP implementation and by mining companies to the provision of social and economic infrastructure through their CSI and SLP spending is essential if more rapid and lasting progress is to be made towards more effective and efficient service delivery, the amelioration of social risk and the attainment of relevant SDGs in South Africa. Although this has been recognised by government and mining houses alike, challenges persist and destructive service delivery protests and increasing social risk remain a serious problem for all stakeholders.

THE CHALLENGE

In light of the above example and the possibilities presented by new technologies, the SETI Project assumes that the need to significantly enhance the effectiveness and efficiency of development planning in mine-affected areas is universally accepted across developing countries. Likewise, the need to make planning truly consultative and sufficiently inclusive to reflect the needs and aspirations of all legitimate stakeholders, especially mine-affected communities, is also recognised. Also, being mindful that the South African experience is to be used illustratively, it is necessary to examine and analyse the empirical evidence that describes the current state of the process of integrated planning and the content of the IDPs, Local Economic Development (LED) strategies and SLPs in these areas.

Understanding the anatomy of these IDPs, LED strategies and SLPs necessitates recourse to data reflected in the plans themselves and that which describes the social and economic context in which they are constructed. A great deal of this data is quantitative and available from a variety of sources both public (institutions such as StatsSA, individual departments within national and provincial government, local municipalities, parastatals, etc.) and private (South African mining houses and other sectors).

However, there is also a wealth of qualitative information that not only describes the living and working conditions of miners and their dependents (in both the mine areas and the labour sending areas) but also reflects the views of mine workers and their communities on matters relating to the impact on their lives. Some of this data is available in a structured form, such as the information published in mining company sustainability reports. There is also a significant body of knowledge that is available in an unstructured form, such as the anecdotal information gleaned from engagements with mine workers and their communities.

The challenge, therefore, is how to use this combination of structured quantitative data and unstructured qualitative data in a way that enables a better understanding of the local economy and the social dynamics at play between the various stakeholders. This is an important prerequisite for informed and coherent integrated development planning at local level, which, in turn, is a necessary condition for improvements in living and working conditions in mine-affected communities. If achieved, this would attenuate the social risks associated with mining and improve its contribution to meeting many of the 169 targets underlying the 17 SDGs.

MD360°'s SETI Project has recently trialled the aggregation of existing knowledge and data from multiple sources and across multiple formats to build a visually accurate, real-time landscape for the user.[21] It will allow practitioners to respond to community needs and social dynamics far more accurately and efficiently than at present. The proof-of-concept process has been successfully completed.[22] Based on these results, MD360° and its partners are now focusing on research to incubate the SETI Project in South Africa to develop the instruments or technology tools that can enhance the efficacy of local development planning frameworks. The project aims to drive innovative collaboration to not only better understand historical to present-day contexts but also, critically, to create scenario-planning tools that will allow for improved engagement. Ultimately, this will place communities and their environments at the centre of development planning, as they should be.

CONCLUSION

Reducing social risk and its potential negative impact is imperative for all stakeholders in the mining space. For governments and private sector investors in mining, social risk constitutes a threat to the generation of distributable resource rents.[23] In South Africa, disenchantment with the levels, standards and cost of services has seen increases in service delivery protests and the destruction of infrastructure at municipal level. Left unchecked it will exacerbate social instability in many communities or undermine current stability. Maintaining the ability to deploy revenues from resource rents and royalties to finance social and economic development is therefore critical.

The interaction of the various technological advances of the Fourth Industrial Revolution creates the opportunity to reduce the negative social and environmental externalities associated with mining. This policy insight has explored why it is important to think about how new technology can help to reduce the social costs of mining and how it might be done. By creating an open-access online platform, researchers will be able to ask better questions and access better data. Big-data analytics means that mine-affected communities' sentiments can be read and interpreted in real time, considerably reducing the transaction costs of traditional information gathering. It also carries the potential to overcome the problem of community fragmentation and illegitimate gatekeeping. Communities will have a voice and be able to hold governments and mining companies accountable in a way that was previously not possible. This kind of platform will also aid more integrated development planning at all levels. At the local level, especially, better data use will allow the formation of better plans and increase the probability that they are implemented. Better data and appropriate use thereof allows a more effective

The interaction of the various technological advances of the Fourth Industrial Revolution creates the opportunity to reduce the negative social and environmental externalities associated with mining

and efficient allocation of resources. As the challenges in the South African case reveal, better data use can only bode well for development aspirations. Moreover, successful deployment of the SETI project holds the promise of replicability across all developing country contexts.

ENDNOTES

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3 AU, 'Africa Mining Vision', February 2009, p. 12, http://www.africaminingvision.org/amv_resources/AMV/Africa_Mining_Vision_English.pdf, accessed 5 March 2018.

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5 Porter ME & MR Kramer, 'Creating shared value', *Harvard Business Review*, 2011, http://www.nuovavista.com/SharedValuePorterHarvardBusinessReview.PDF, accessed 2 February 2018.

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7 One important contribution on this topic is: *The World Bank, World Development Report: Managing Risk for Development*, 2014, http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1352909193861/8936935-1356011448215/8986901-1380046989056/WDR-2014_Complete_Report.pdf, accessed 2 February 2018.

8 EY Report, 'Top 10 business risks facing mining and metals 2017/2018', http://www.ey.com/Publication/vwLUAssets/ey-top-10-business-risks-facing-mining-and-metals-2017-2018/$FILE/ey-top-10-business-risks-facing-mining-and-metals-2017-2018.pdf, accessed 2 February 2018. The report ranks social risk as 7 out of its identified top 10, down from 4 in the previous year's report. The firm still refers to a 'social license to operate', which is telling in itself because it suggests that too many companies view community benefit as a pre-requisite for their 'core business', rather than seeing the two as dynamically integral.

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12 Altenburg T & D Rodrik, 'Green industrial policy: Accelerating Structural change towards wealthy green economies,' in Altenburg T & C Assmann (eds), *Green Industrial Policy: Concept, Policies, Country Experiences*. Geneva: German Development Institute & Partnership for Action on Green Economy, 2017.

13 The World Bank Group, *The Growing Role of Minerals and Metals for a Low Carbon Future*. Washington, DC: World Bank, 2017.

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starting to demand improved social performance: 'Laurence D Fink, founder and chief executive of the investment firm BlackRock, is going to inform business leaders that their companies need to do more than make profits – they need to contribute to society as well if they want to receive the support of BlackRock.' Sorkin A, 'BlackRock's message: Contribute to society, or risk losing our support', *New York Times*, 15 January 2018, https://www.nytimes.com/2018/01/15/business/dealbook/blackrock-laurence-fink-letter.html, accessed 12 February 2018.

16 Rogerson CM, 'Mining-dependent localities in South Africa: The state of partnerships for small town local development', *Urban Forum*, 23, 2012, pp 107–32.

17 For an extensive recent account, see Bloom K & S Wales-Smith, 'Stealing the crust: How the Bakgatla Ba Kgafela were robbed of their inheritance', *Daily Maverick*, 1 February 2018, https://www.dailymaverick.co.za/article/2018-02-01-stealing-the-crust-how-the-baktatla-ba-kgafela-were-robbed-of-their-inheritance/#.WoGgV2Z7HUK, accessed 12 February 2018.

18 See Bloom K, 'What's mine is mine: How the Bapo Ba Mogale got robbed of R800 million', *Daily Maverick*, 26 October 2016, https://www.dailymaverick.co.za/article/2016-10-26-whats-mine-is-mine-how-the-bapo-ba-mogale-got-robbed-of-r800-million/, accessed 12 February 2018.

19 The Mineral and Petroleum Resources Development Act No. 28 of 2002 requires the submission of a Social and Labour Plan (SLP) as a prerequisite for the granting of any and each mining or production right. The SLP requires applicants for such mining and production rights to develop and implement comprehensive human resources development programmes, a mine community economic development plan, a housing and living conditions plan, an employment equity plan, and processes to save jobs and manage downscaling and/or closure.

20 South Africa, Department of Mineral Resources, Guidelines: Revised Social and Labour Plans, http://www.dmr.gov.za/guidelines-revised-social-and-labour-plans.html, accessed 5 March 2018.

21 The data is qualitative (drawn from literature, social media, traditional media, community-based conversations and so forth) and quantitative (drawn from national statistics, income surveys, macro- and micro-economic 'big data'). The significant differentiator is that the machine algorithm codifies unstructured qualitative data and allows the user to derive an accurate quantitative picture in response to any given question. The algorithm will become more accurate as new data feeds the machine and the machine learns. Inspiration for the concept is drawn from the breakthroughs experienced in the health sector where mobile technologies (cameras, smart phones and so on) and machine learning are being used, for instance, to detect early signs of cervical cancer by sifting through big data (photographs and user information) to make accurate diagnoses without patients having to physically see a doctor. For one example, see Champlin C, Bell D & C Schocken, 'AI medicine comes to Africa's rural clinics', *IEEE Spectrum*, 27 April 2017, https://spectrum.ieee.org/biomedical/devices/ai-medicine-comes-to-africas-rural-clinics, accessed 21 February 2018. For a more general overview of applying new technology to the health field, see Faggella D, 'Machine learning healthcare applications – 2018 and beyond', *techemergence*, 30 January 2018, https://www.techemergence.com/machine-learning-healthcare-applications/, accessed 21 February 2018.

22 For an example of 'proof of concept' in the use of AI, see a document released by the Big Innovation Centre, 'Provocations and Discussion Points', 20 April 2017, http://www.biginnovationcentre.com/media/uploads/pdf/TIB_Meeting%20Provocations_20042017.pdf, accessed 5 March 2018.

23 The surplus value that remains once all factors of production have been compensated is referred to as the rent from mineral resources. In broad terms these rents are allocated between the host government and company investors in a manner that depends on the fiscal regime in place.

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